

Chapter 13

Water Security Agency—Regulating Water Use

1.0 MAIN POINTS

Saskatchewan has over 100,000 waterbodies (i.e., lakes and rivers), of which about 10,000 have human demand for water use. Part of the responsibility of the Water Security Agency is to plan for sustainable use of water including authorizing (i.e., licensing) individuals and companies to draw water from ground and surface water sources. At 2018, the Agency had licensed the annual use of about 1.4 million cubic decameters of water—enough to fill over 550,000 Olympic-size swimming pools each year.

Estimating long-term water availability is difficult, and requires making assumptions using scientific calculations. Estimating availability of groundwater is even more challenging because groundwater is harder to accurately measure and quantify than surface water.

Furthermore, Saskatchewan's water resources and demand for water is not evenly distributed across the province. Southern Saskatchewan has more demand for water given its population and industries (e.g., oil and potash extraction, and irrigation) that require sustainable water to operate. Also, southern Saskatchewan is typically a relatively dry area with a high variability in annual precipitation.

At December 2019, the Water Security Agency had, other than in the following areas, effective processes to regulate water use to support a sustainable water supply. It reasonably monitors the quantity of water in and flowing through Saskatchewan on an overall basis. But, it needs to do more to better regulate on a water-use licence basis. This includes:

- Developing guidance about staff documenting key decisions and analysis when assessing water-use licence applications and water availability
- Developing enforcement procedures to help identify and address significant non-compliance with conditions imposed on individual water-use licences
- Maintaining accurate water-use data to enable better monitoring of water use, and actively monitoring whether licensed water users comply with water-use licences
- Giving senior management reports on the nature and extent of non-compliance and related enforcement activities

Furthermore, to support the achievement of its goal of ensuring a sustainable water supply, the Agency needs to update when it expects to complete outstanding key regulating-water-use actions from its *25 Year Saskatchewan Water Security Plan*.

An increasing demand for water, combined with a potentially drier climate, increases the importance of regulating water. Effective monitoring of water allocations and usage is key to Saskatchewan having a sustainable supply of water available. A safe and secure water supply is essential to Saskatchewan's continued economic development and high standard of living for both current and future generations.



2.0 INTRODUCTION

This Chapter reports the results of our audit of the processes the Water Security Agency uses to regulate water use.

2.1 Background

Under *The Water Security Agency Act*, the Agency is responsible for regulating and controlling the flow of water in lakes, rivers, reservoirs or other water bodies in Saskatchewan.^{1,2} Part of this responsibility is to plan for sustainable use of water including authorizing individuals and companies to draw water from ground (e.g., aquifers) or surface (e.g., rivers, lakes) water sources.^{3,4}

The Water Security Agency Act and *The Water Security Agency Regulations* set the regulatory process and requirements for water-use licensing (e.g., application and authorization). By law, water users who wish to draw water from an existing water source must first obtain from the Agency an approval to construct and operate systems or infrastructure to divert water, then apply for a water-use licence. The Act does not require users to obtain water-use licences for certain domestic water use less than five cubic decameters per year.^{5,6} Five cubic decameters, or five million litres, is approximately enough water to fill two Olympic-size swimming pools.

The Agency has distributed responsibility for managing water-use licences. For example:

- The Licensing and Water Use Branch is responsible for the regulatory processes for water-use approvals and licensing. The Branch employs about ten staff who are located primarily in Moose Jaw. Staff review and approve applications for long-term water use, such as for commercial mining operations.
- The Hydrology and Groundwater Services Branch is responsible for assessing the sustainability of water sources expected to provide the amount of water the applicant is requesting. Staff do these assessments upon request of the Licensing and Water Use Branch. The Hydrology and Groundwater Services Branch has about 20 staff located primarily in Regina and Moose Jaw whose responsibilities include assessing the availability of water, and monitoring surface water inflows and outflows.
- Five regional offices review and approve applications for temporary surface water use.⁷ These offices are located in Swift Current, North Battleford, Yorkton, Nipawin, and Weyburn.

As of 2019, the Agency, through approximately 14,500 long-term and 1,800 temporary water-use licences, has granted approval for the use of almost 1.4 million cubic decameters of water annually. As shown in **Section 5.0**, other than for power generation, irrigation is the largest purpose of water use, which primarily uses surface water;

¹ *The Water Security Agency Act*, s. 6(1).

² The Water Security Agency is responsible for provincial water management.

³ An aquifer is an underground layer of water-bearing rock used for water extraction.

⁴ *The Water Security Agency Act*, s. 50 – 58.

⁵ *The Water Security Agency Act* defines domestic water use as household and sanitary purposes, the watering of livestock, the spraying of crops and the watering of non-commercial lawns and gardens adjoining private residences.

⁶ www.wsask.ca/Permits-and-Approvals/Water-Allocation/ (13 March 2020).

⁷ A temporary water licence is for the duration of less than a year.

municipalities (e.g., drinking water) are the second largest purpose of water use, which use both surface and ground water.

2.2 Impact of Water Usage and Climate Change on Water Sustainability

Water is the foundation for biological, economic, social, and environmental prosperity in Saskatchewan. It supports people, irrigation, livestock, power generation, and industry. The quantity of water in our rivers and lakes depends on a number of different factors. These include the speed of snowmelt in the spring, plus rain and soil conditions. Other factors such as groundwater discharge and storm runoff also play a role.⁸

As water demand increases because of growth in population and/or economic activities, competition for water may increase.⁹ Climate change poses significant threats to environmental sustainability, economic growth, biodiversity, human health, infrastructure, and water resource management. For example, increasing climate variability increases risks of floods and droughts, while longer periods of warmer temperatures affect water supply management.¹⁰ The demand for available water continues to increase with industrial growth, and agricultural developments (e.g., increased use of irrigation).¹¹

Australia demonstrated the importance of effectively regulating water use when its Darling River started running dry. In the early 2000s, an irrigated agricultural region experienced a significant drought, resulting in the mouth of the Darling River running dry. The three controllable contributing factors were allowing farmers to buy and sell water-use licences according to farmers' needs in a given season, farmers illegally extracting water from the river (i.e., not having a water-use licence) or exceeding their water-use licence, and the government not effectively enforcing the water-use rules.¹²

Like Australia, the largest factor impacting sustainability of water supplies that the Water Security Agency can control is how much water it allows to be taken out of Saskatchewan's surface and ground water sources.

Effective monitoring of Saskatchewan's water allocations and usage is key to having a sustainable supply of water available. A safe and secure water supply is essential to Saskatchewan's continued economic development and high standard of living for both current and future generations.

3.0 AUDIT CONCLUSION

We concluded that, for the 12-month period ended December 31, 2019, the Water Security Agency had, other than in the following areas, effective processes to regulate water use to support a sustainable water supply.

⁸ Ministry of Environment 2017 *State of the Environment Report*, pp. 44 and 50.

⁹ *Present and Future Water Demand in Saskatchewan – A Summary by River Basin*, p. i.

¹⁰ 2017 *Report – Volume 1*, Chapter 4, pp. 41-42.

¹¹ www.parc.ca/saskadapt/success-stories/water-conservation.html (13 November 2019).

¹² *The Economist*, May 19, 2018, pp. 34-35. www.economist.com/asia/2018/05/19/australias-biggest-river-is-running-dry-despite-plans-to-save-it (26 March 2020).



The Agency needs to annually update when it expects to complete key actions originally set in its *25 Year Saskatchewan Water Security Plan* to better support the achievement of its goal of ensuring the sustainability of surface and groundwater supplies.

At December 2019, the Agency reasonably monitors the quantity of water in and flowing through Saskatchewan primarily on an overall basis. To help it better regulate on a water-use licence basis, the Agency needs to:

- **Develop guidance to help ensure staff consistently document key decisions and analysis, including water availability, when assessing applications for water-use licences**
- **Develop enforcement procedures to help it identify significant non-compliance and actions to take when it identifies non-compliance**
- **Maintain accurate data about licensees' actual use of water, including doing more to obtain reports on actual water use where individual water-use licences require such reporting**
- **Actively monitor whether water users comply with individual water-use licences, such as whether licensees used more water than allowed**
- **Report to senior management on the nature and extent of non-compliance and related enforcement activities**

Figure 1—Audit Objective, Criteria, and Approach

Audit Objective: To assess whether the Water Security Agency, for the 12-month period ending December 31, 2019, had effective processes to regulate water use (subject to regulation) to support a sustainable water supply. The Agency regulates all water users other than certain domestic water users. This audit did not include the Agency's regulation of water quality.

Audit Criteria:

Processes to:

1. Plan for sustainable water availability
 - 1.1 Estimate short- and long-term water supply (e.g., region, water basin)
 - 1.2 Estimate short- and long-term water demand (e.g., evaporation, sustainability, existing licenses)
 - 1.3 Use relevant scientific methods (e.g., flow calculations) to determine availability
 - 1.4 Establish measures for desired water availability
2. Issue water-use licences
 - 2.1 Establish water-use licence requirements (e.g., legislation, water sustainability plan, licensing conditions and terms)
 - 2.2 Screen applications (e.g., approval to construct and operate, suitability of proposed water source)
 - 2.3 Issue appropriate water-use licences
3. Monitor sustainable water use
 - 3.1 Track actual water use (licenced users, use by unlicensed users)
 - 3.2 Use reliable data to evaluate impact of water use
 - 3.3 Take action as necessary (e.g., revoke/revise licences, revise licence requirements)
 - 3.4 Report results to senior management and the public

Audit Approach:

To conduct this audit, we followed the standards for assurance engagements published in the *CPA Canada Handbook—Assurance* (CSAE 3001). To evaluate the Agency's processes, we used the above criteria based on our related work, reviews of literature, including reports of other auditors, and consultation with management. The Agency agreed with the above criteria.

We examined the Agency's policies and procedures relating to regulating water use. We interviewed Agency staff responsible for allocating water resources, and regulating water-use licences. We discussed water use regulation with SaskWater.^A In addition, we reviewed related documentation (e.g., training manuals, water-use licences, and water agreements with neighbouring provinces). We tested samples of short- and long-term water-use licences to assess the Agency's licensing processes, and another sample of water-use licences to assess the Agency's monitoring activities. We analyzed the Agency's water-use data to assess the extent to which licensees exceeded their water-use allocation. In addition, we used an independent consultant with subject matter expertise in the area to help us identify good practice, and assess the Agency's processes.

^A SaskWater is Saskatchewan's commercial Crown water utility, helping communities, First Nations and industry gain access to reliable and professional water and wastewater services.

4.0 KEY FINDINGS AND RECOMMENDATIONS

4.1 Agency Behind on Planned Actions Related to Regulating Water Use in its 25 Year Water Security Plan

While the Agency's *25 Year Saskatchewan Water Security Plan* includes a key goal and many actions related to regulating water use in a sustainable way, the Agency has not revisited or updated target completion dates for actions not completed within the original planned timeframes.

In 2012, the Agency released its *25 Year Saskatchewan Water Security Plan*.¹³ The Plan's goal related to regulating water use is to ensure the sustainability of our surface and ground water supplies. In addition, 22 of its 89 actions relate to regulating water use. For these 22 action items, the target completion years in the Plan range from 2014 to 2016.¹⁴

The Agency uses its annual report to keep the public informed about the ongoing relevance of actions set out in the Plan, and the status of its implementation of actions of continued relevance. At December 2019, it had not updated the status of actions since March 31, 2019.

Our analysis of the status of the 22 actions related to regulating water use at March 31, 2019 found the Agency completed nine actions (40%), abandoned four actions (18%), is taking ongoing action on two actions (9%), and has not completed seven actions (32%). See **Section 6.0** for listing of the 22 actions, the initial target completion date, and the status of the action as per the Agency's *Annual Report for 2018-19*.¹⁵

Incomplete actions include analyzing the water supply situation in major rivers, and undertaking comprehensive water management analysis for priority surface and groundwater systems. The Plan's original target date for completion of most of these actions was 2016.

Management indicates that the Agency abandoned certain actions due to a shift in direction and priorities since it developed the Plan in 2012. It further noted it was taking longer to complete actions than originally planned due to this shift. For example, the Agency was focusing on implementing a new Agriculture Water Management Strategy for regulating the

¹³ www.wsask.ca/About-WSA/Publications/25-Year-Water-Security-Plan/ (13 March 2020).

¹⁴ Ibid.

¹⁵ www.wsask.ca/About-WSA/Publications/Water-Security-Agency-Annual-Reports/ (13 March 2020).



drainage of agricultural land. It noted the implementation of this Strategy required a significant change in the regulation of drainage, and was taking considerable resources.¹⁶

By not updating or revising the targets for relevant key actions in its Plan, the Agency increases the risk of not completing timely, important actions to achieve its goal of ensuring the sustainability of surface and groundwater supplies.

1. We recommend the Water Security Agency update completion date targets for relevant key actions originally set in its 25 Year Saskatchewan Water Security Plan pertaining to regulating water use to ensure water sustainability.

4.2 Potential Water-use Licence Applicants Adequately Informed

The Agency's legislation creates a clear, understandable framework for water-use licences. The Agency adequately informed potential water-use licence applicants of licensing requirements.

The Agency provides potential water-use licence applicants with numerous sources of publicly available information on the water-use licensing process and requirements.

As noted in **Figure 2**, the risk associated with issuing a licence for use of surface water (e.g., lake water) is lower than for groundwater (e.g., well water from aquifers) in that users and the Agency can more accurately estimate the amount of water available and can see the impact of surface water use. As a result, the Agency has different water-use licensing requirements and licence terms for requests for use of groundwater and surface water. For example, the Agency requires new groundwater-use applicants to provide a third-party engineering report assessing the sustainability of the aquifer supplying the water.

Also, the Agency typically makes groundwater-use licences valid for a maximum of five years, and surface water-use licences for a maximum of 25 years. The Agency makes temporary licences valid for a maximum term of one year. Water users must apply to renew licences when expired.

We found the shorter duration for groundwater licences consistent with good practice. The shorter term recognizes the difficulties in monitoring water use and sustainability because groundwater is harder to estimate its availability (e.g., not physically visible).

Figure 2—Summary of Key Surface and Groundwater Water-Use Licensing Requirements and Risk Profile

	Surface water	Groundwater
Water source	Lakes, rivers, reservoirs, sloughs	Aquifer
Application required (including name of individual/company, type of project, amount of water requested, and location of water source)	Yes	Yes

¹⁶ Chapter 12 of our 2018 Report – Volume 1 reports on our 2017 audit of the Agency's processes to regulate drainage of water on agricultural lands.

	Surface water	Groundwater
Technical assessment required from the Agency's Hydrology & Groundwater Services Branch on sustainability of water source	Yes – if one does not already exist	No – applicant required to supply third party engineering groundwater investigation report for first-time requests ^A
Licence term (Agency established practice)	Maximum of 25 years	Maximum of 5 years
Extent of uncertainty of water availability–rationale	Lower–easier to assess water availability (e.g., water source visible). Can see impact of water use on water source	Higher–more difficult to accurately measure water availability and cannot see impact of water withdrawal

Source: Adapted from Water Security Agency information.

^A Third party engineering firms prepare groundwater investigation reports on behalf of the applicant to assess if the aquifer can support water withdrawal request.

We found applicants can access sufficient and understandable information on licencing requirements (i.e., who needs a licence, information required, application templates) on the Agency's website.¹⁷ Applicants are also able to call the Agency directly for more information.

Establishing a clear structure for water-use licences increases the ability and likelihood that water users will understand and follow the rules.

4.3 Suitably Qualified Staff Used to Regulate Water Use and Assess Water Sustainability

The Agency uses suitably qualified staff with up-to-date knowledge of industry practice to review and approve water-use licences, and to assess sustainability of water sources from which applicants have requested licences for water use.

The Agency maintains job descriptions for each staff position. These descriptions follow a standard template, which sets the responsibilities and education requirements for each position.

We found the educational requirements for staff responsible for water-use licencing and for assessing water sustainability were reasonable given assigned responsibilities. For example, the Agency requires most staff of the Licensing and Water Use and the Hydrology and Groundwater Services branches to hold a Bachelor of Science (e.g., Engineering, Biology) or Masters of Engineering.

We found at December 2019, each staff member in the above branches possessed the educational qualifications set in their position job description.

In addition, the Hydrology and Groundwater Services Branch provides its staff with training and training manuals on how to carry out water availability studies. Staff in this Branch also establish relationships with local universities and hold memberships in national associations (e.g., Canadian Water Resource Association) to keep up-to-date on changes in industry practices.

¹⁷ www.wsask.ca/Permits-and-Approvals/Regulatory-Info/ (10 March 2020).



The Licensing and Water Use Branch primarily uses on-the-job training to help staff learn Agency processes for reviewing water-use licence applications.

Qualified staff enable the Agency to complete and understand scientific work involved in regulating water use and assessing water availability. Qualified staff enhance the Agency's credibility as it conducts its regulatory role.

4.4 Written Procedures Required for Assessing Water-use Licence Applications

While the Agency's practices to review and approve water-use licence applications are understood by staff, they are largely unwritten and somewhat incomplete.

In 2019, the Agency issued approximately 1,800 temporary water-use licences, and approved or renewed about 170 groundwater and 130 surface long-term water-use licences. At December 2019, the Agency had issued about 14,500 long-term water-use licences in effect with permission to use up to about 1.4 million cubic decameters of water.

The Agency's regional offices receive, review, and approve applications for temporary use of surface water. The Licensing and Water Use Branch reviews and approves applications for requests other than for temporary surface water use.

Instead of written procedures, the Agency relies on the knowledge and experience of its staff to appropriately review and approve water-use licence applications (i.e., new and renewal).

The Agency gives Licensing and Water Use Branch staff responsible for processing applications for long-term water use the authority to make a number of key decisions. As shown in **Figure 3**, staff decide:

- For groundwater use, when to ask licence renewal applicants to supply an updated third party engineering investigation report about water availability
- For groundwater use, the nature and extent of internal water availability assessments necessary when Licensing and Water Use staff decide not to request updated engineering investigation reports when assessing licence renewal applications
- For groundwater use, when to ask Hydrology and Groundwater Services Branch to review third party engineering investigation reports provided by applicants
- For surface water use, when to ask the Hydrology and Groundwater Services Branch for an in-depth assessment of surface water availability on a new or renewal application
- For surface water use, the nature and extent of internal water availability assessments necessary when Licensing and Water Use staff decide not to request updated water availability assessments from the Hydrology and Groundwater Services Branch when assessing surface licence renewal applications
- The term of the licence

- The licence conditions (e.g., annual allowable water use [referred to as allocation], and requirements for reporting actual water use)

Figure 3—Expected Practices of Licensing and Water Use Branch for Processing Long-term Water-use Applications

- **Receipt of application:** Upon receipt of an application for water use, the Licensing and Water Use Branch reviews the application package for completeness. Where an applicant fails to provide key information, staff are to follow up by phone or email. The Branch does not actively pursue the receipt of missing information; rather it waits until the applicant provides the missing information.

- **Approve a new, or renew an existing licence:** The Licensing and Water Use Branch uses the results of the assessment of water availability to decide on whether to approve a new, or renew an existing licence.

For new groundwater use applications, the Licensing and Water Use Branch requires applicants to supply third-party engineering reports to assess if the requested amount of water is sustainably available.

For groundwater use renewals, the Licensing and Water Use Branch decides on a case-by-case basis whether applicants must supply an updated a third-party engineering investigation report. If not, it carries out its own assessment of the water availability.

The Licensing and Water Use Branch seeks advice on a case-by-case basis from the Hydrology and Groundwater Services Branch (e.g., to determine whether third-party engineering reports completed appropriately).

For new surface water use applications, the Licensing and Water Use Branch only assesses if the requested amount of water is sustainably available when a previous water availability study exists for that water source. If such a study does not exist, the application is forwarded to the Hydrology and Groundwater Services Branch for an in-depth assessment of water availability from that water source.

For surface water-use renewals, the Licensing and Water Use Branch decides on a case-by-case whether to request an updated water availability study from the Hydrology and Groundwater Services Branch. If not, it carries out its own assessment of the water availability by using internal knowledge of the water source.

- **On approval of new and renewed groundwater and surface water-use licences, terms and conditions are set.**

The Branch decides on a case-by-case basis the term of water-use licence (up to 25 years for surface water and up to five years for groundwater).

On all long-term licences, it imposes general licence conditions about its right to cancel, alter or suspend the licence as per *The Water Security Agency Act*. It requires all industrial water-use licences to report to the Agency on actual water use; these users pay a fee based on the amount of water used.^A

It decides on a case-by-case basis the amount of annual water allocation (the maximum amount of water permitted to use), and whether to impose other conditions on the licensee. Other conditions could include requiring the licensee to track and report to the Agency actual water usage annually.

Source: Adapted from information provided by Water Security Agency management.

^A The Agency charges industries using water for processing, mineral exploration and mining, oil exploration and recovery, manufacturing, gravel washing, hydraulic pressure testing, thermal power generation, and other purposes the Agency may designate. The rate charged depends on the use of the water and the source of the water. Agricultural water users are exempt. www.wsask.ca/Permits-and-Approvals/Regulatory-Info/Industrial-Water-Use-Charges/ (13 March 2020).

However, the Agency does not provide written criteria or expectations to staff to guide which water-use licences should require reporting of actual water use, or on-going monitoring of water use. Rather written guidance is limited to expecting the inclusion of a condition requiring water users to track and report actual water use annually for projects where monitoring is required, and providing examples of licence conditions for both surface and groundwater-use licences.

Providing clear guidance to staff on when to require water users to track and report actual water use is important. This information enables the Agency to determine if licensees comply with licences (i.e., do not exceed water allocations).



Good practice recognizes requiring all licensees to have water flow meters or other water-use measuring devices to measure all types of water use is not economically feasible. Some jurisdictions impose water-use measurement and reporting requirements on licensees with higher annual allocations of water use. For example, we found Manitoba required all licensed water users to track and report actual water usage using a water meter or timing device to measure actual usage.¹⁸ Manitoba only licenses water users who wish to draw over about 9.1 cubic decameters each year (i.e., 25,000 litres per day).¹⁹

In addition, we found the Agency, when considering renewals of groundwater-use licences, did not set in writing what work it expects staff to do to determine water use remains sustainable before renewing a licence. For example, work may include review of recent third party engineering reports for wells drilled nearby or actual water-use data for the licensee. We found it reviewed actual water-use data for some renewals in 2019, but did not do so consistently. Nor does the Agency expect staff to request the applicant to supply updated third-party engineering reports periodically.

Furthermore, while the Agency informally expects staff to document their decisions, and the basis of those decisions, it has not set, in writing, minimum documentation staff are to keep or where documentation should be kept.

As shown in **Figure 4**, we found the Agency keeps information about water-use applications and related licences in various locations and formats. It tracked surface water availability studies completed since the 1990s in an electronic listing. It did not keep a listing of water availability studies completed prior to the 1990s, which are only stored in paper files. It did not have a centralized list of all completed water availability studies; staff continue to use these studies as the basis of decisions to issue new or renew surface water-use licences, when newer studies have not been completed. The Agency's current, experienced staff readily knew where to find and store other information.

Figure 4—Location of Information Within Agency for Key Steps in Licence Approval Process

Key Step	Long-term Water Use Licences		Temporary Water Use Licences
	Surface water	Groundwater	
Application received, and requests for missing information from applicants	Standard application form and related correspondence kept in licensee manual file in Branch		Standard application form and related correspondence kept in Agency's temporary water-use licence IT application
Applicant-supplied third party engineering investigation report ^A		Report kept in licensee manual file in Branch	
Requests for Hydrology and Groundwater Services Branch to do a water availability study	Email may be kept in licensee manual file in Branch or in email IT system of Branch staff sending request		

¹⁸ For example, devices can measure the amount of water flowing through a pipeline from a water body to the water user.

¹⁹ www.gov.mb.ca/sd/water/water-rights/water-use/index.html (13 March 2020).

Key Step	Long-term Water Use Licences		Temporary Water Use Licences
	Surface water	Groundwater	
Hydrology and Groundwater Services water availability studies	Hydrology and Groundwater Services Branch maintains master copy in Moose Jaw. Licencing and Water Use Branch include a copy in individual licensee manual file for which study was done. No listing by water body maintained.		
Term of Licence	In approved licence maintained in licensee manual file with key details tracked in long-term licence IT database (e.g., licence number, client name, date of issuance, purpose, annual quantity of water allocated, source of supply)		Agency's temporary water-use licence IT application
Licence conditions	In approved licence maintained in licensee manual file		Agency's temporary water-use licence IT application

Source: Adapted from information provided by Water Security Agency management.

^A Third party engineering firms prepare groundwater investigation reports on behalf of the applicant to assess if the aquifer can support water withdrawal request.

We found for the 25 long-term water-use licences (14 groundwater, 11 surface water) and 15 temporary water-use licences issued or renewed from January 1 to November 30, 2019 that we tested:

- For each new surface licence tested, sufficient water availability studies were on file and determined the requested water allocation was sustainable from the water source.
- For each, the manual licensee file and licence database included key information about the licence; information in the database was consistent with information in the manual file.
- For each, the issued licences included standard general conditions (e.g., ability for the Agency to cancel, amend, or suspend licence), and annual allowable amount of water use.
- For 24 of 25 long-term licences, the duration of the term of each licence was within the maximum term (i.e., 25 years for surface water use, and five years for ground water use). One groundwater-use licence tested was for a cattle-watering bowl using water supplied from a low-volume well that had a 25-year term. We found rationale for the term reasonable.
- For each, an individual with appropriate authority approved the licence.

However, for six of the 14 groundwater licence renewals we tested, each water-use licence file did not contain evidence showing whether the planned water-use continued to be sustainable. For two of these six groundwater licence renewals, each file did not contain a groundwater investigation report/water well driller report as the Agency initially issued the licence in the 1960s when it did not have this requirement. We found the last written assessments in these six files were between 11 and 51 years old. Two of these licences had annual water allocations of less than five cubic decametres; two had allocations between 10 and 30 cubic decametres; and two had allocations between 300 and 400 cubic decametres.



For another 30 water-use licences (23 surface water, and seven groundwater) we tested, for each, the licence was approved by an individual with appropriate authority.

However, for four non-industrial groundwater-use licences we tested, each did not require the licensee to report actual water use to the Agency. Two of these licences had annual allocations of around 1 cubic decametres; one had an allocation of 3 cubic decametres; and one had an allocation of 12.3 cubic decametres. Whereas, for other licences we tested with similar water use, the Agency required annual reporting of actual water use.

Not having clear, written guidance increases the risk of the Agency not treating applicants equitably. That is, issuing water-use licences for similar situations with differing term lengths and conditions. In addition, not having written procedures for staff to follow when assessing water-use licence applications (e.g., checklists) increases the risk of staff not obtaining and maintaining sufficient information to support the Agency's decisions. Furthermore, written guidance allows for knowledge transfer in the event of staff turnover.

2. We recommend the Water Security Agency develop written procedures for processing and approving applications for water use.

4.5 Water Levels of Key Water Bodies and High-risk Aquifers Actively Monitored

The Agency monitors water levels of key water bodies and aquifers.

For surface water, the Agency, and Environment and Climate Change Canada have approximately 300 hydrometric monitoring stations located throughout the province to monitor water inflows and outflows in water bodies in real time.²⁰ They have located most of these monitoring stations in southern Saskatchewan; this area has the highest demand for water use.

We found these monitoring stations were located in areas of highest risk (i.e., those with the largest amount of water users) and on the largest waterbodies.

For ground water, the Hydrology and Groundwater Services Branch uses a risk-based plan to determine which aquifers to monitor during the year. We found this plan helped the Branch focus its finite resources (both human and financial) on aquifers with higher risk levels. For example, the Branch monitors the Zehner aquifer located east of Regina due to an increasing demand from municipal and industrial development. This increased demand for water could potentially exceed the aquifer's supply, if not managed appropriately over the long term.

Actively monitoring high-risk aquifers and water bodies with higher water utilization supplies the Agency with critical information to help it determine whether requested water use from a water body is sustainable.

²⁰ Hydrometric monitoring stations are electronic devices installed at specific locations to measure the volume of water flowing into or out of a waterbody. Technology sends readings from the stations to the Agency, and Environment and Climate Change Canada in real time.

4.6 Work Underway to Increase Consideration of Potential Impact of Climate Change on Water Availability

At December 2019, the Agency was actively working on increasing its understanding of climate variability and climate change to enable better consideration of these on sustainability of water supply.

To increase its understanding of climate variability and climate change, the Agency takes two approaches.

First, to better understand the historical variability in Saskatchewan's climate, it is working on expanding its climate records back hundreds of years. These records correlate measured water records with tree ring information to determine the hydrology of the past. It is using this information to help with understanding risks to water availability. It is taking steps to obtain data on historical water flow on most major basins in the province so it can include this information in future water availability studies.

Second, to predict future climate variability, it is actively involved in several studies attempting to predict local changes in climate. For instance, it is working with partners studying water supply in the Souris River. The Agency is working to take large climate change models and downscale the data to model climate scenarios representative of the local climate, and use the results to determine impacts on water supply. It expects to use such studies to better understand how risky or uncertain future water supply could be.

Working to better understand future climate change is important to enable the Agency to include this forward-looking analysis in its water availability studies. Including this analysis will help ensure its water availability studies do not over-estimate water availability in the future.

4.7 Simplistic but Reasonable Processes Used to Determine Surface Water Availability

The Agency uses a reasonable method to determine surface water availability. Some of its processes to estimate information used within its method are simplistic.

The Hydrology and Groundwater Services Branch uses water availability studies as its main way of determining availability of surface water from a specific water body, and the sustainability of the water source. It does these studies upon request of the Licensing and Water Use Branch.

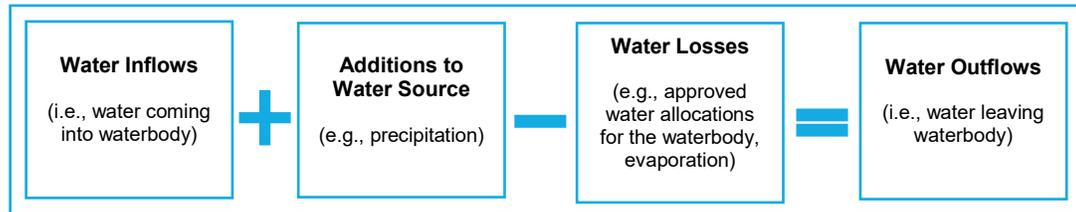
The Licensing and Water Use Branch may make this request when it is assessing a request for water use (i.e., received a new surface water water-use application, or request for renewal of existing licence).

We found the Hydrology and Groundwater Services Branch's training manual and materials provide sufficient detail to understand the Agency's method to predict surface water availability including the key processes to carry out such studies. Its method uses a water balance equation. See **Figure 5** for a simplified overview of this equation.



We also found the training materials include sufficient information on where to find information within the Agency relevant to doing these studies, and how the Agency predicts water inflows (e.g., scientific calculations).

Figure 5—Simplified Overview of Water Balance Equation Used to Determine Water Availability from a Water Source



Source: Adapted from information provided by Water Security Agency management.

When predicting water availability from a water source, Hydrology staff consider historical information about water inflows and additions to the water source (e.g., precipitation) and water losses. In addition, they consider water losses related to allowable amounts of water-use based on existing licences (allocations). Staff consider a range of conditions (e.g., drought). They use their analysis to determine whether the water source can sustain the water removal requested in a water-use application.

We found, while some of the Hydrology and Groundwater Services Branch's processes to estimate inputs used in its method to predict water availability were simplistic compared to other available processes, they met minimum good practice. Other available processes use scientific calculations to assess evaporation instead of using historical information. Where practical, we encourage the Agency to consider using more sophisticated processes to estimate information used in its method to predict surface water availability.

Using sufficient processes to estimate water availability allows the Agency to make appropriate water allocation decisions to ensure surface water supplies remain sustainable.

4.8 Better Documentation of Key Judgments Made in Surface Water Availability Studies Needed

Water availability studies for surface water-use licences did not always clearly document key judgments to predict availability of water, and conclusions reached about the sustainability of requested amount of water from a water source.

While not specifically stated in the training materials, the Hydrology and Groundwater Services Branch expects staff to consider and assess each of the components of the water balance equation (see **Figure 5**). The Branch further expects staff to document their assessment of each component in a written water availability study. The Licensing and Water Use Branch uses the conclusion of the water availability study when determining whether the Agency will issue a new or renew an existing surface water-use licence.

For five surface water availability studies we tested, we found:

- Three studies (and supporting documents) did not document the analysis of all components of the water availability assessment or why staff did not consider particular components (e.g., existing water allocations, evaporation).
- One study did not have a clear conclusion on whether the water source was sustainable or not. No licence was issued for the water body in this study.

Management agreed the Agency should have documented its analysis and conclusion.

Not documenting key judgments increases the risk of not having support for the conclusion about whether the surface water source can sustain the requested amount of water use. In addition, it increases the risk of the Agency not being able to verify or demonstrate staff made the appropriate decision in approving (or not approving) a surface water-use licence. Furthermore, not documenting key judgments increases the risk of loss of knowledge in the event of staff turnover.

3. We recommend the Water Security Agency clearly document its consideration of key components used to predict water availability of a proposed water source before related surface water-use licences are approved.

4.9 More Active Enforcement of Actual Water-use Reporting Needed

The Agency does not actively enforce water-use reporting requirements.

The Agency requires some water-use licensees, as a water-use licence condition, to self-report actual water usage. It relies on them to accurately measure and report actual water usage. In some cases, it requests licensees to self-report actual water usage, even though not required by the water-use licence.²¹ This information helps it estimate water use.

Similar to the practice in Alberta and Manitoba, it does not verify the accuracy of self-reported water use (e.g., inspect licensees' equipment, records).²² Rather where the Agency receives reports on actual water usage from individual licence holders, it informally tries to compare its records to available third-party data (e.g., from SaskWater and the Ministry of Energy and Resources).²³ It notes comparisons, at times, are challenging as the third-party data is not always presented the same way as the Agency's information.

Where possible, the Agency investigates discrepancies between self-reported water use (or its estimates thereof) and the third-party data (e.g., discusses with licence holder to determine if the water meter is in the appropriate location).

We observed the Agency compared its 2018 data to SaskWater data as expected, and last compared its data to Ministry data in 2017. About 3 percent of the 2018 annual water

²¹ Self-reported water use required by a water-use licence and Agency-requested self-reporting collectively referred to as requested for remainder of this section.

²² Section 89 of *The Water Security Agency Act* gives the Agency authority to complete inspections.

²³ The Agency receives annual reporting from SaskWater and upon request from the Ministry.



allocation was to customers of SaskWater (e.g., municipal use, water supplied to potash mines), and about 3 percent was used by the oil and gas sector (i.e., oil and gas companies report water usage to the Ministry).

Our analysis of the 2018 Agency water-use licence records found:²⁴

- The Agency requested self-reporting of actual water use for just over 20 percent of long-term water use licences (i.e., about 3,150 of the approximately 14,500 long-term water-use licences).
- The Agency received only about 50 percent of the requested reporting on actual water use. As shown in **Figure 6**, just over one-half of licensees not reporting have annual water allocations of less than 50 cubic decametres. The largest water user that did not provide requested reporting had an allocation of over 8,500 cubic decametres.

Figure 6—Summary of the Licensees Requested to Report Actual Water Usage Annually that Did Not Submit Reporting for 2018

Water Allocation Amount (cubic decametres)	Number of Licensees That Did Not Report
0 ^A	331
0.1 – 50	780
51 – 100	119
101 – 300	179
301 – 999	82
1,000 – 2,000	22
Greater than 2,000	11
Total	1,524

Source: Adapted from information supplied by the Water Security Agency.

^A Allocation is set under another licence. For example, irrigation districts hold the water-use licence with an allocation. Each individual irrigator within that irrigation district hold their own water-use licences with an allocation set to zero, but record water use under this licence. The Agency asks each irrigator to report their usage.

We also found the Agency took little action to obtain the reports. Rather its actions were limited to sending licensees a reminder letter of the due date to submit reports. We did not find any instances where the Agency suspended or cancelled a licence of a licensee who failed to submit requested reports.

Not receiving requested information on water use increases the risk of the Agency not having sufficient information to make reasonable estimates of water use. Also, not enforcing licence conditions increases the risk of the licensees not regarding the Agency as an effective regulator. See **Recommendations 5** and **6** about actively monitoring whether licensees comply with water-use licence conditions, and developing written enforcement procedures for staff to address identified non-compliance with water-use licences.

4.10 Reliable Actual Water-use Data Needed

While the Agency used reasonable ways to estimate water use, it did not consistently maintain accurate information about water use.

²⁴ Water use data for 2019 was not due for reporting at the time of our audit.

The Agency often estimates amount of water used. As **Figure 7** shows, in 2018, it estimated water use for almost 90 percent of licensees.

Figure 7—Summary of the Agency’s 2018 Water-use Data

Source of Agency’s 2018 Water-use Data	Number of Water -use Licences	Percent of Total Licences
Actual water-use reporting from licensee (typically manufacturing, mining, oil and gas, municipal purposes)	1,559	11%
Agency-estimated usage based on reasonable estimation method (for irrigation)	871	6%
Agency-estimated water usage based on allocated amount (typically for multi-purpose and other (e.g., domestic) purposes)	9,339	64%
Agency-estimated water usage at 0	2,741	19%
Total	14,510	100%

Source: Adapted from information supplied by the Water Security Agency.

We found the Agency’s practice of estimating water use consistent with some other jurisdictions (e.g., Alberta). While estimating water use can be appropriate, using estimates for many licences increases the risk it has insufficient or unreliable water-use data to assess compliance with licences.

In general, the Agency uses three approaches to estimate water usage.

- For water used for irrigation, it uses a simplistic yet reasonable method to estimate water use—about one-quarter of its 2018 annual water allocations were for irrigation purposes.
- For water used primarily for domestic purposes, it often uses its annual allocation as its estimate—about 1 percent of its 2018 annual water allocations were for domestic purposes. Where the Agency estimated water use in 2018, we found the Agency based its estimate on annual allocation for about 65 percent of licences. Our analysis noted these individual licences typically have smaller amounts of water allocated. Based on this, we considered this a practical method.
- For licensees the Agency estimated had little activity or did not draw water from the licensed water source during the year (e.g., industrial users that have not operated recently but maintain their allocation), it estimated water use as zero. These licences had an annual water-use allocation ranging from 0 to 28,000 cubic decametres.

While its estimation practices are not documented, we found staff understood them.

However, we found the Agency inaccurately recorded both self-reported actual water use and estimated water use information in the Agency’s water-use database. For five estimated water-use records we tested:

- For two licences, the estimated water use recorded in its database did not agree with the estimated water-use amount (i.e., annual allocation in the licence).

Further analysis of the Agency’s 2018 water-use data found 33 additional licences we expect contain similar data entry errors.



- For two other licences, the water use recorded in its database did not agree with the amount reported by the licensee. In addition, for each of these two licences, the database incorrectly noted these items as estimates instead of actuals reported by the licensee.

Also, during our detailed review of 27 water-user licences where the database showed usage exceeded allocation significantly, we found seven licences where the Agency's water-use data contained errors. For example, staff incorrectly entered actual water-use amounts into its database because of an incorrect unit of measure (e.g., licensee reported in gallons instead of cubic decameters). Upon further investigation, we found these seven water users did not exceed their allocation.

Not consistently keeping accurate records about water use reduces the ability to analyze the impact of use on a water source or individual licensee basis (e.g., to assess whether licensees complied with approved annual water allocation). Having documented processes to record actual reported water use and to make and record estimates in its database, may help the Agency to keep accurate records on water use.

4. We recommend the Water Security Agency implement written procedures about estimating and recording licensed water use.

4.11 Monitoring of Compliance with Water-use Licences Needed

The Agency's tracking of information about individual water-use licences does not enable effective monitoring of licensee compliance with annual water allocations. As a result, the Agency does not actively monitor whether individual licensees exceed their annual water allocation.

Our analysis of the water-use of licensees for the period 2014 to 2018 found the following:

- Seven licence holders exceeded their allocation by more than 100 cubic decametres (i.e., 100 million litres) at least once during 2014 to 2018 (based on self-reported actual water-use).
- For four licences, the Agency's estimated water-use amount exceeded the licensee's allocation by more than 100 cubic decametres.

Not actively monitoring whether individual licensees exceed annual licensed water-use allocations increases the risk of unidentified non-compliance with water-use licence provisions. If individual licensees consistently use significantly more water than allowed, there is increased risk of:

- The Agency making inappropriate water allocation decisions for the related waterbody. The Agency may estimate more water is available from the water body and issue additional water-use licences where additional water is not available.
- Water not being available for other licensed water users.
- Negatively impacting the environment (e.g., insufficient water downstream from the water body to support the ecosystem, reducing habitat for animals).

- Jeopardizing the long-term sustainability of water bodies.

5. We recommend the Water Security Agency actively monitor whether water-use licensees comply with key water-use licence conditions.

In addition, the Agency did not analyze water-use data to identify water-use trends by water source, region or type of licence, other than it annually assessed municipal water use to identify trends (e.g., per-capita use).²⁵

As shown in **Figure 8**, our analysis of water allocation and use by purpose from 2016 to 2018 found, on an overall basis, sectors did not use more water than allocated.

Figure 8—Long-term Water Licensed for Use (Allocated vs Used) by Purpose (in Cubic Decameters)

Purpose	Cubic Decameters (000s)					
	2016		2017		2018 ^A	
	Licensed Allocation ^B	Used ^C	Licensed Allocation ^B	Used ^C	Licensed Allocation ^{B,F}	Used ^C
Power Generation ^D	463	13	458	18	457	18
Irrigation	361	142	359	209	357	199
Municipal	297	104	297	131	295	120
Mining–Potash	100	34	64	21	61	24
Multi-purpose	73	0.5	73	0.5	73	0.5
Manufacturing	47	11	46	12	46	11
Oil & Gas	38	16	40	19	46	19
Other ^E	40	23	53	32	44	34
Total	1,419	343.5	1,390	442.5	1,379	425.5

Source: Adapted from Water Security Agency records.

^A At the time of our report, the Agency's 2019 actual water-use data was not available.

^B Licensed water allocation is based on amounts set in water-use licences in effect.

^C Water used is primarily based on Water Security Agency's estimation of use.

^D Water used for power generation is flowed through the generation station and returned to the water source. Therefore, the licence holder does not use water as with other water-use licences; however it is important to track this allocation to plan for the water to be available.

^E Other includes water for recreation, water management, intensive livestock, domestic, and mining (other than potash) purposes.

^F At the end of 2018, the Agency had allocated in total an additional 187,000 cubic decameters for water users who were approved to construct water infrastructure and were still working to obtain a long-term water-use licence.

4.12 Enforcement Processes Needed

The Agency has not established processes to guide enforcement actions to address non-compliance with water-use licence conditions.

The *Water Security Agency Act* gives the Agency the authority to cancel, suspend, or amend water-use licences.²⁶ The Agency indicated it was not aware of any instances where it cancelled or suspended water-use licences in the last five years.

²⁵ Water Security Agency *Saskatchewan Community Water Use Records*. www.wsask.ca/About-WSA/Publications/Community-Water-Use-Records/ (12 April 2020).

²⁶ *The Water Security Agency Act*, section 53.



The Agency does not have written processes (or informal practices) setting how to identify non-compliance, what constitutes significant non-compliance (e.g., repeatedly not submitting water-use reporting, exceeding allocated water amount), or actions to address identified significant non-compliance (e.g., warning letters, suspension or cancellation of licences).

By not having effective written processes to enforce water-use licence conditions or consequences for significant non-compliance, the Agency increases the risk that licence holders continue to violate licence conditions without consequence. Licensees may continue not providing the Agency with actual water use reporting (if required) or exceeding their allocation.

- 6. We recommend the Water Security Agency develop written enforcement procedures for staff to follow when the Agency identifies licensed water users not complying with water-use licences.**

4.13 More Robust Reporting to Senior Management on Water-use Regulatory Program

The Agency does not give senior management sufficient information about water users identified as not complying with water-use licences and related enforcement activities.

The Agency tracks and reports to management, each month, key activity-based information on water-use licences (e.g., number of new licences issued, number of licences renewed, number of licences cancelled, and number of applications received).

Annually, senior management receives information about water use and water allocation. In addition, the Agency routinely reports this information to the public using various formats (e.g., the Agency's Annual Report, annual community water use reporting, periodic Ministry of Environment State of the Environment Report). We found the *2017 State of the Environment Report* includes information on demand for surface water compared to available surface water.

The *2017 State of the Environment Report* is the most current report released including information about water. The State of the Environment Report is released every two years.²⁷ The Ministry of Environment expects to release the next report that includes information about water in 2021.²⁸

Senior management does not receive written reports about licence holders not complying with water-use licences (e.g., water use significantly exceeding water allocation), or the implications of non-compliance (e.g., disregard for the Agency's regulatory role, impact on water sustainability). Also, senior management does not receive information about enforcement strategies to achieve compliance.

²⁷ The Ministry's 2019 State of the Environment Report focused on its progress in achieving sustainable forest management.

²⁸ www.saskatchewan.ca/residents/environment-public-health-and-safety/state-of-the-environment/about-the-report1 (13 March 2020).

By not reporting this information to senior management, the Agency increases the risk of senior management not being aware of the nature and extent of non-compliance, and implications thereof. It also may increase the risk of the Agency not taking sufficient or appropriate action to bring water-use licence holders into compliance for significant infractions.

7. We recommend the Water Security Agency periodically give senior management written reports on non-compliance with key water-use licence conditions, and related enforcement strategies and actions.

5.0 NUMBER OF LONG-TERM WATER LICENCES, ALLOCATION, AND USE BY PURPOSE IN 2018

Purpose	Number of Long-term Water Licences			In Cubic Decameters (000s)	
	Total	Groundwater	Surface water	Licensed Allocation ^D	Use
Power Generation ^A	38	30	8	457	18
Irrigation	3,756	41	3,715	357	199
Municipal	2,174	1,809	365	295	120
Mining–Potash	36	25	11	61	24
Multi-purpose ^B	127	89	38	73	0.5
Manufacturing	79	53	26	46	11
Oil & Gas	300	283	17	46	19
Other ^C	<u>8,000</u>	<u>689</u>	<u>7,311</u>	<u>44</u>	<u>34</u>
Total	14,510	3,019	11,491	1,379	425.5

Source: Adapted from Water Security Agency data.

^A Surface water is used for power generation. Groundwater-use licences are for wells around the generation stations to remove groundwater to help keep the generation station infrastructure stable. Surface water used for power generation is flowed through the generation station and returned to the water source. Therefore, the licence holder does not use water as with other water-use licences; however it is important to track this allocation to plan for the water to be available.

^B Multi-purpose licences are for water users that use water for multiple purposes (e.g., domestic, irrigation, and for livestock).

^C Other includes water for recreation, water management, intensive livestock, domestic, and mining (other than potash) purposes.

^D At the end of 2018, the Agency had allocated in total an additional 187,000 cubic decameters for users who were approved to construct water infrastructure and were still working to obtain a long-term water-use licence.

6.0 25 YEAR SASKATCHEWAN WATER SECURITY PLAN—ACTIONS AND TARGETS RELATED TO REGULATING WATER USE

25 Year Saskatchewan Water Security Plan—Action Items	Target Completion Date ^A	Status Update at March 31, 2019 ^B
1.1a) Promote adoption of best conservation and efficiency practices and technology through education, regulations, water licence conditions and new programming	Ongoing	Abandoned
1.2a) Evaluate existing water supplies and future demands for the next 25 years and beyond to determine the need for new infrastructure across the province	2016 and Ongoing	Incomplete



25 Year Saskatchewan Water Security Plan—Action Items		Target Completion Date ^A	Status Update at March 31, 2019 ^B
1.2b)	Investigate alternative measures to increase the delivery of water from Lake Diefenbaker to Buffalo Pound Lake, including evaluation of the feasibility of the Qu'Appelle South irrigation project	2014	Complete
1.3a)	Develop a modern system of water allocation, including a new allocation policy and regulations	2014	Ongoing
1.3b)	Review existing water rights licences and assess current water use	2014 (priority) 2016 (other)	Ongoing
1.3c)	By watershed, determine the existing use of water, level of protection of environmental flows, how much water is available for future allocation, and identify areas where water scarcity may be a factor	2014 (priority) 2016 (other)	Abandoned
1.4d)	Develop new criteria for allocation licences based on best practice and new technologies to sustainably support irrigation	2016	Complete
1.6a)	Develop detailed aquifer maps	2016	Abandoned
1.6b)	Analyze the water supply situation in the major rivers	2016	Incomplete
1.6c)	Determine the existing water use by sector and delineated by the major basins	2016	Complete
1.6d)	Examine projected water demand by sector within major basins to the year 2060	2016	Complete
1.7b)	Assess how the economic value of water could be used in allocation decision-making	2016	Complete
5.3b)	Develop new regulations for water allocation to help manage shortages during droughts	2014	Complete
6.1a)	Complete a strategic review of major monitoring programs, including surface water, groundwater and water quality	2015	Complete
6.1b)	Develop an integrated geographically referenced database to provide government-wide and public access to water-based information	2015	Incomplete
6.1c)	Consolidate precipitation data and information through the development of co-operative agreements and partnerships with government and non-government organizations	2014	Complete
6.2d)	Publish the State of the Watershed Report every 5 years in an expanded form which can be applied by government in the renewal of the 25 Year Saskatchewan Water Security Plan and by the public in decision-making	Ongoing	Abandoned
6.3a)	Support the work of the Global Institute for Water Security at the University of Saskatchewan in their assessment of the water supply and quality issues in the South Saskatchewan River	Ongoing	Incomplete
7.6a)	Continue to work with the Prairie Provinces Water Board to evaluate the resiliency of the Master Agreement on Apportionment	Ongoing	Complete
7.6b)	In support of the Mackenzie River Basin Board, negotiate bilateral agreements with Alberta and the North West Territories	2016	Incomplete
7.7a)	Undertake comprehensive water management analysis for priority surface and groundwater systems	2014 (priority) 2016 (other)	Incomplete
7.7b)	Implement new watershed modelling and data base management systems to allow efficient evaluation of new requests for water and ensure that cumulative effects are considered	2014 (priority) 2016 (other)	Incomplete

^A Adapted from information in the 25 Year Saskatchewan Water Security Plan.

^B Adapted from information in the Saskatchewan Water Security Agency Annual Report for 2018-19.

7.0 SELECTED REFERENCES

- Auditor General of Canada. (2010). *2010 Fall Report of the Commissioner of the Environment and Sustainable Development, Chapter 2 – Monitoring Water Resources*. Ottawa: Author.
- Auditor General of Nova Scotia. (2014). *Report of the Auditor General May 2014, Chapter 7 – Natural Resources: Mineral Resource Management*. Halifax: Author.
- Provincial Auditor of Saskatchewan. (2018). *2018 Report – Volume 1, Chapter 4, Energy and Resources—Regulating Oil, Gas, and Pipeline Industry Incidents*. Regina: Author.
- Provincial Auditor of Saskatchewan. (2015). *2015 Report – Volume 1, Chapter 11, Environment—Regulating Industrial Wastewater Systems*. Regina: Author.
- Provincial Auditor of Saskatchewan. (2018). *2018 Report – Volume 1, Chapter 12, Water Security Agency—Regulating Drainage*. Regina: Author.
- Provincial Auditor of Saskatchewan. (2017). *2017 Report – Volume 1, Chapter 11, Saskatchewan Liquor and Gaming Authority—Regulating Commercial Permittees’ On-table Sale of Liquor*. Regina: Author.